



Morbidity

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CREATING A CULTURE OF HEALTH IN APPALACHIA

DISPARITIES AND BRIGHT SPOTS



KEY FINDINGS | Physically Unhealthy Days

- The average adult in the Appalachian Region reports feeling physically unhealthy 14 percent more often than the average American.
- With 5.1 physically unhealthy days per person per month, residents in Central Appalachia report feeling physically unhealthy 42 percent more often than the average American. This figure is the highest among the five Appalachian subregions.
- Residents living in the Appalachian Region's rural counties are 24 percent more likely to report feeling physically unhealthy than those living in the Region's large metro areas.
- Residents living in the Appalachian Region's distressed counties are 25 percent more likely to report feeling physically unhealthy than those living in the Region's non-distressed counties.

Background

Physically unhealthy days are the number of days per month the average adult age 18 years and older reports feeling physically unhealthy or of poor physical health. The data for this measure come from County Health Rankings and are based on CDC's Behavioral Risk Factor Surveillance System (BRFSS) survey data collected in 2014. The data for this measure have been age-adjusted.

This measure is intended, in part, to examine overall quality of life; that is, how do people *feel* on a typical day? It is also intended to capture the aspects of poor health that may not be picked up by other morbidity measures focusing on specific diseases and illnesses. Data for physically unhealthy days are collected as part of the BRFSS survey in which respondents are asked, "Now, thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?"

Understanding the number of days people *feel* sick or unhealthy is an important component when examining a community's health status (Froshaug, Dickinson, Fernald, & Green, Personal Health Behaviors are Associated with Physical and Mental Unhealthy Days: A Prescription for Health (P4H) Practice-based Research Networks Study, 2009). As such, the measure has been applied in both public health and clinical research contexts (Moriarty, Zack, & Kobau, 2003). In addition to the physical health effects, physically unhealthy days can inhibit a person's ability to obtain gainful employment and, in some instances, can also affect a person's mental health status. Some researchers believe that physically unhealthy days are a precursor of future health issues and demands for medical care (Dominick, Ahern, Gold, & Heller, 2002). Based on a county-level analysis, more physically unhealthy days were found to be correlated with higher unemployment and poverty rates, as well as lower rates of high school completion (Jia, Muennig, Lubetkin, & Gold, 2004). These socioeconomic patterns are evident throughout studies examining physically unhealthy days.

Overview: Physically Unhealthy Days in the Appalachian Region

Overall, at 4.1 days per person per month, Appalachian residents report approximately 0.5 more physically unhealthy days per month than the national average of 3.6, or around 6 more days per person per year. Northern Appalachia is the best-performing subregion at 3.7 days per month, a figure still higher than the national average. Rates are markedly higher in Central Appalachia, with residents in the subregion reporting 1.5 more physically unhealthy days per month than the average American. The average of 5.1 days per person per month in this subregion is 42 percent higher than the national average. North Central (4.5 days per person per month), South Central (4.3 days), and Southern Appalachia (4.1 days) are all relatively similar: not quite as extreme as Central Appalachia but still performing worse than the nation as a whole.

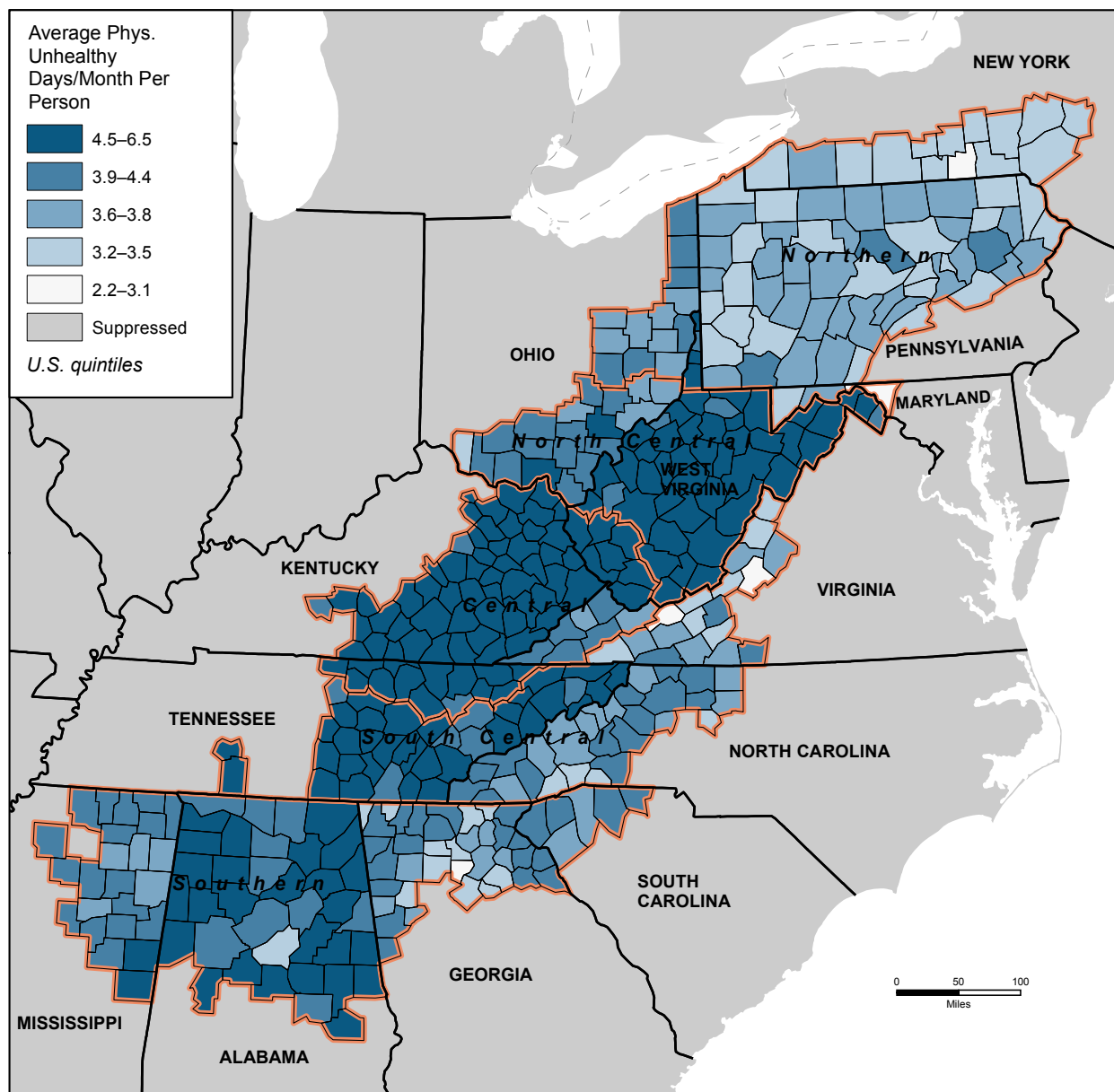
There is an urban-rural divide within the Region, with residents in rural counties reporting an average of 4.6 days per person per month (or 55 days per year), a figure 24 percent higher than the 3.7 days per person per month (or 44 days per year) reported in the Region's large metro counties. There is a stark difference in the frequency of physically unhealthy days based on a county's economic status. Residents in Appalachian counties classified as distressed report an average of 5.0 days per person per month (or 60 days per person per year), a mark 25 percent higher than the average in the Region's non-distressed counties of 4.0 days per person per month (or 48 days per person per year). The average for the Region's non-distressed counties is still 11 percent higher than the national average.

The Appalachian portions of Alabama, Kentucky, and Tennessee, as well as all of West Virginia, report the highest numbers of physically unhealthy days in the Region. The average for each of these areas is around 5 days per month (or 60 days per year), well above the national average of 43 days per year. As expected given the subregional patterns, the Appalachian portions of Maryland, New York, and Pennsylvania all experience levels either at or below the national average.

Figure 37 displays the variation in the average number of physically unhealthy days reported per person per month across the Appalachian Region. Darker colors indicate a greater frequency of physically unhealthy days. Many counties throughout the North Central, Central, and South Central Appalachian subregions, as well as Appalachian Alabama, rank in the worst-performing national quintile for this measure.

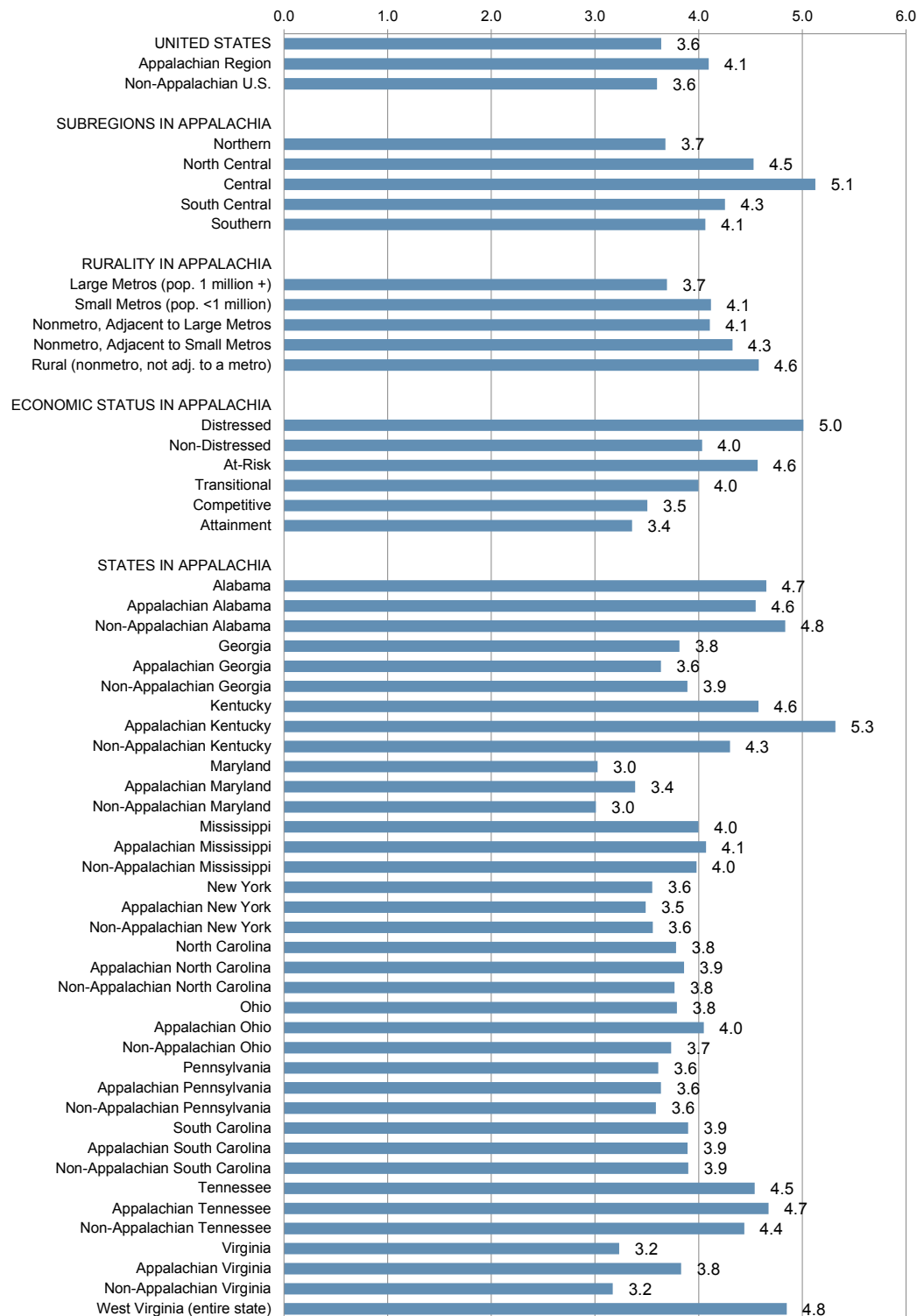
Figure 38 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 37: Map of Physically Unhealthy Days per Person per Month in the Appalachian Region, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Figure 38: Chart of Physically Unhealthy Days per Person per Month, 2014

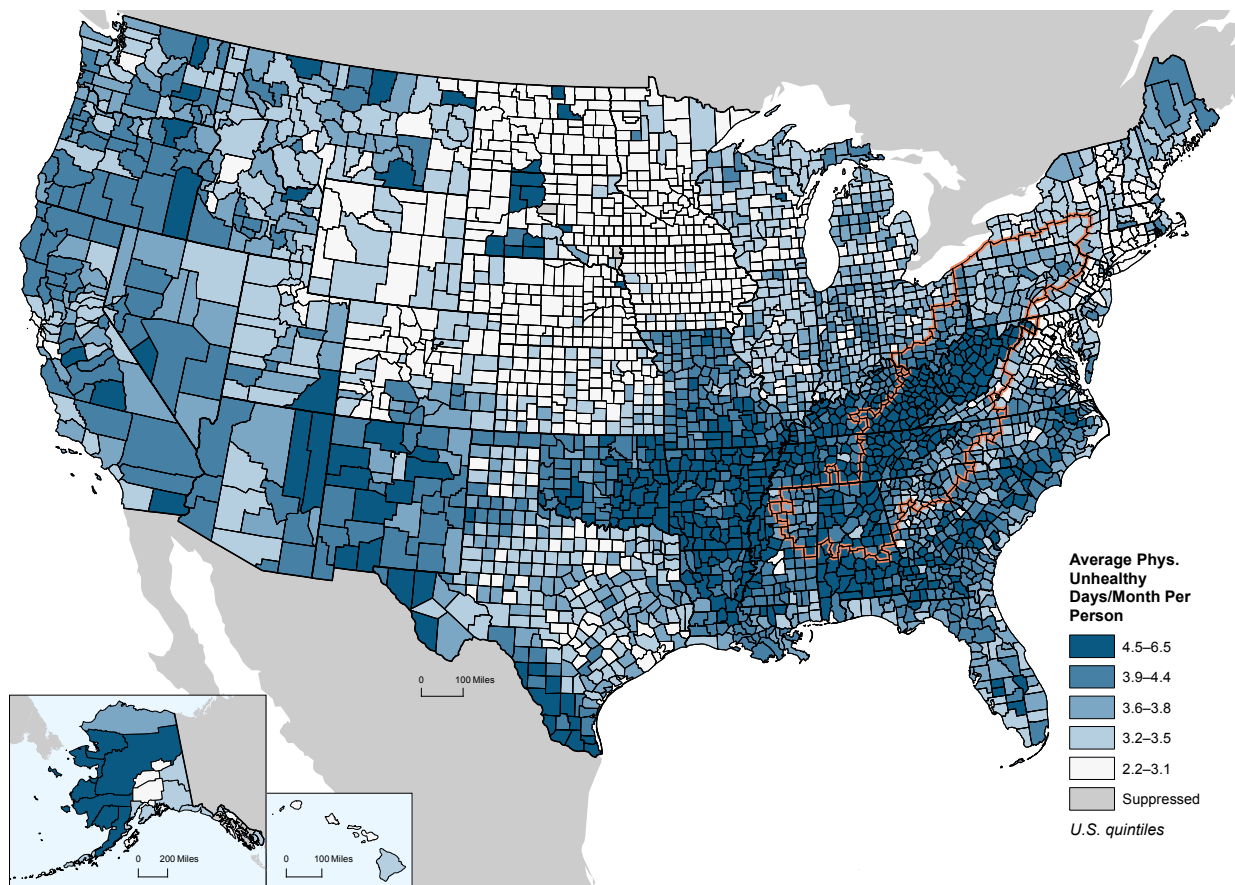


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Overview: Physically Unhealthy Days in the United States

Figure 39 shows the variation in the frequency of physically unhealthy days across the United States. The pattern of high values in Central Appalachia extends into much of the southern part of the country, including the coastal Southeast. The Mississippi Delta region has noticeably high levels that stretch into Missouri to the north and Oklahoma to the west. There are also pockets of poor performance throughout the West, although few counties rank in the worst-performing national quintile. Meanwhile, many counties throughout the Northeast and upper Midwest rank in the best-performing national quintile. There also appears to be a positive trend around large metropolitan areas throughout the country.

Figure 39: Map of Physically Unhealthy Days per Person per Month in the United States, 2014

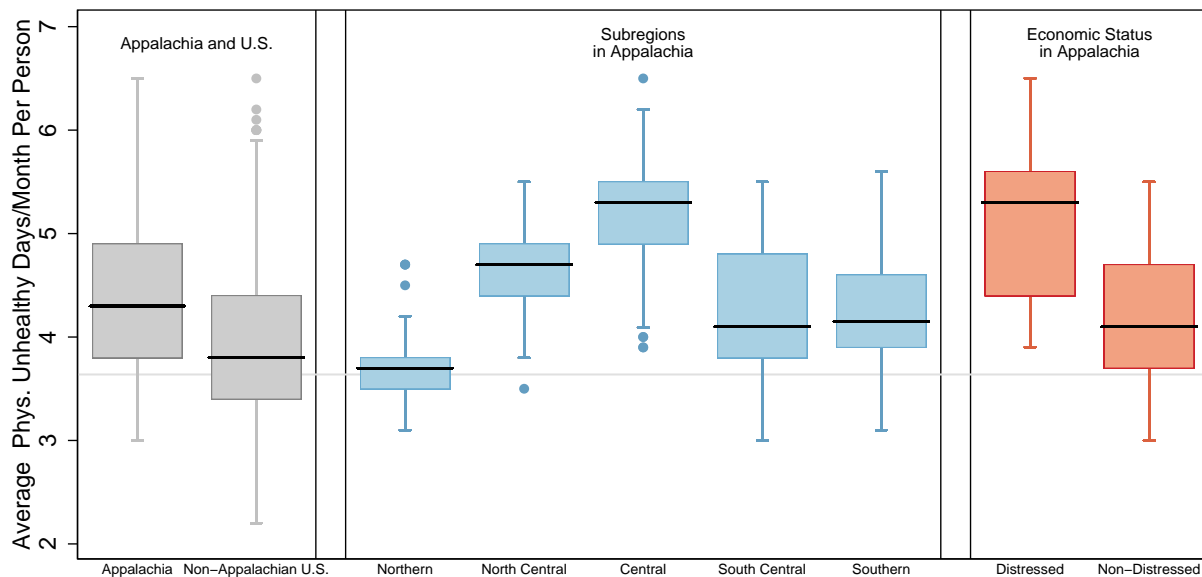


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Distribution of Physically Unhealthy Days

Figure 40 shows the distribution of physically unhealthy days by geography and economic status. The shaded boxes show the middle 50 percent of all values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, five have a missing value for this indicator. For this measure, higher values are associated with worse health.

Figure 40: Box Plot of Physically Unhealthy Days per Person per Month by Geography and Economic Status, 2014



Grey line denotes national average. 5 of 3113 counties have a missing value for this indicator. For this indicator, higher values are associated with worse health.

Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

The distribution of physically unhealthy days among national quintiles for Appalachian counties is shown in Table 21. Of the 420 counties in the Region, 177 (42 percent) rank in the worst-performing national quintile, while only 5 (1 percent) rank in the best-performing national quintile.

Table 21: Distribution of Physically Unhealthy Days per Person per Month among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Physically unhealthy days	5	1%	39	9%	93	22%	106	25%	177	42%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

KEY FINDINGS | Mentally Unhealthy Days

- The average resident in Appalachia reports feeling mentally unhealthy 14 percent more often than the average American.
- With 4.5 mentally unhealthy days per person per month, residents in both North Central and Central Appalachia report feeling mentally unhealthy 25 percent more often than the average American.
- Residents living in the Appalachian Region's rural counties are 10 percent more likely to report feeling mentally unhealthy than those living in the Region's large metro areas.
- Residents living in the Appalachian Region's distressed counties are 10 percent more likely to report feeling mentally unhealthy than those living in the Region's non-distressed counties.

Background

Mentally unhealthy days are the number of days per month the average adult age 18 and older reports feeling mentally unhealthy or of poor mental health. The data for this measure come from County Health Rankings and are based on CDC's Behavioral Risk Factor Surveillance System (BRFSS) survey data collected in 2014. The data for this measure have been age-adjusted.

This measure is intended, in part, to examine overall quality of life; that is, how do people *feel* on a typical day? It is also intended to capture the aspects of poor health and quality of life that may not be picked up by other morbidity or well-being measures. Data for mentally unhealthy days are collected as part of the BRFSS survey in which respondents are asked, "Now, thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

Counties with greater numbers of mentally unhealthy days have higher unemployment, poverty, disability, and mortality rates, as well as lower high school completion rates (Jia, Muennig, Lubetkin, & Gold, 2004). Higher levels of education and income are also correlated with lower numbers of mentally unhealthy days (United Health Foundation, 2016).

Not every poor mental health day reflects a condition requiring treatment. Transitory conditions such as grief, for example, or temporary anxiety or stress, are also captured as part of this measure. Still, poor mental health days may have an effect on a person's ability to work or care for a dependent child or family member. Mental health issues may also lead to physical health issues (Canadian Mental Health Association, 2017).

Overview: Mentally Unhealthy Days in the Appalachian Region

At 4.1 days per person per month, Appalachian residents report approximately 0.5 more mentally unhealthy days than the national average of 3.6, or around 6 more days per person per year. Northern Appalachia is the best-performing subregion at 3.9 days per person per month, a figure still higher than the national average. Levels are markedly higher in both North Central and Central Appalachia, with their residents reporting 0.9 more mentally unhealthy days per month than the average American. The average of 4.5 days per person per month in these subregions is 25 percent higher than the national average. South Central Appalachia (4.2 days per person per month, 17 percent higher than the national average) and Southern Appalachia (4.1 days, 14 percent higher) also perform worse than the nation as a whole.

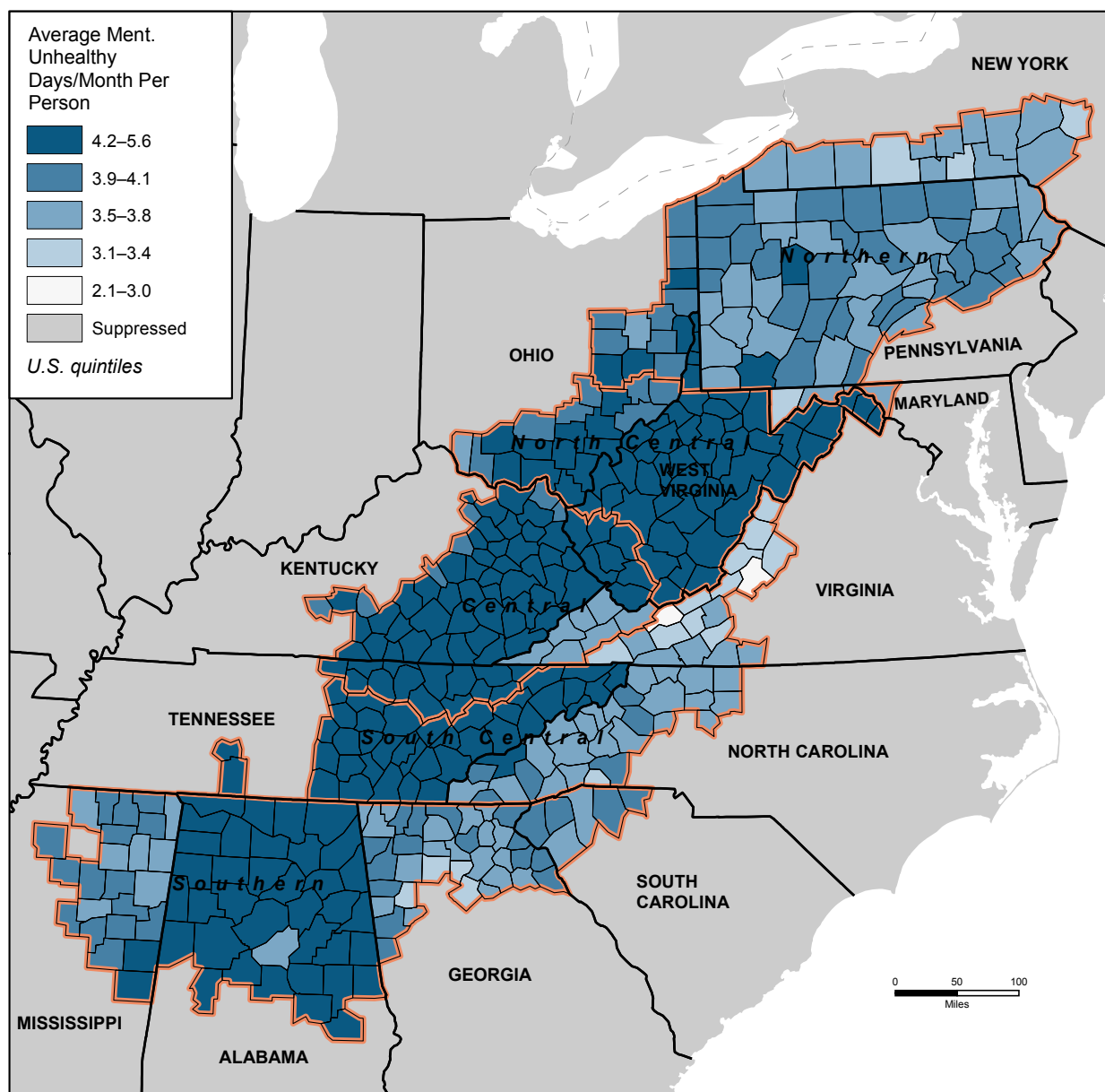
There is some degree of an urban-rural divide within the Region, with residents in rural counties in the Appalachian Region reporting an average of 4.3 mentally unhealthy days per person per month (or 52 days per person per year), a figure 10 percent higher than the 3.9 days reported in the Region's large metro counties (or 47 days per person per year). There is also a divide in the frequency of mentally unhealthy days based on a county's economic status. Residents in Appalachian counties classified as distressed report an average of 4.5 days per person per month (or 54 days per person per year), which is 10 percent higher than those in non-distressed counties (4.1 days per person per month, 49 days per person per year). The average among non-distressed counties is still 14 percent higher than the national average.

Residents in the Appalachian portions of Alabama, Kentucky, and Tennessee, as well as all of West Virginia, report the highest numbers of mentally unhealthy days in the Region. The averages in the Appalachian portions of these four states are all 4.5 per person per day or higher, which is 25 percent higher than the national average. Although pockets of the Region experience levels of strong performance, Appalachian Virginia, with 3.6 mentally unhealthy days per person per month, is the only Appalachian portion of any state on par with the nation as a whole.

Figure 41 shows the variation of mentally unhealthy days across the Appalachian Region. Darker colors indicate higher rates of mentally unhealthy days. The majority of counties in North Central and Central Appalachia rank in the worst-performing national quintile. Large portions of both South Central and Southern Appalachia also perform poorly on this measure, while most of Northern Appalachia appears to be close to the national average.

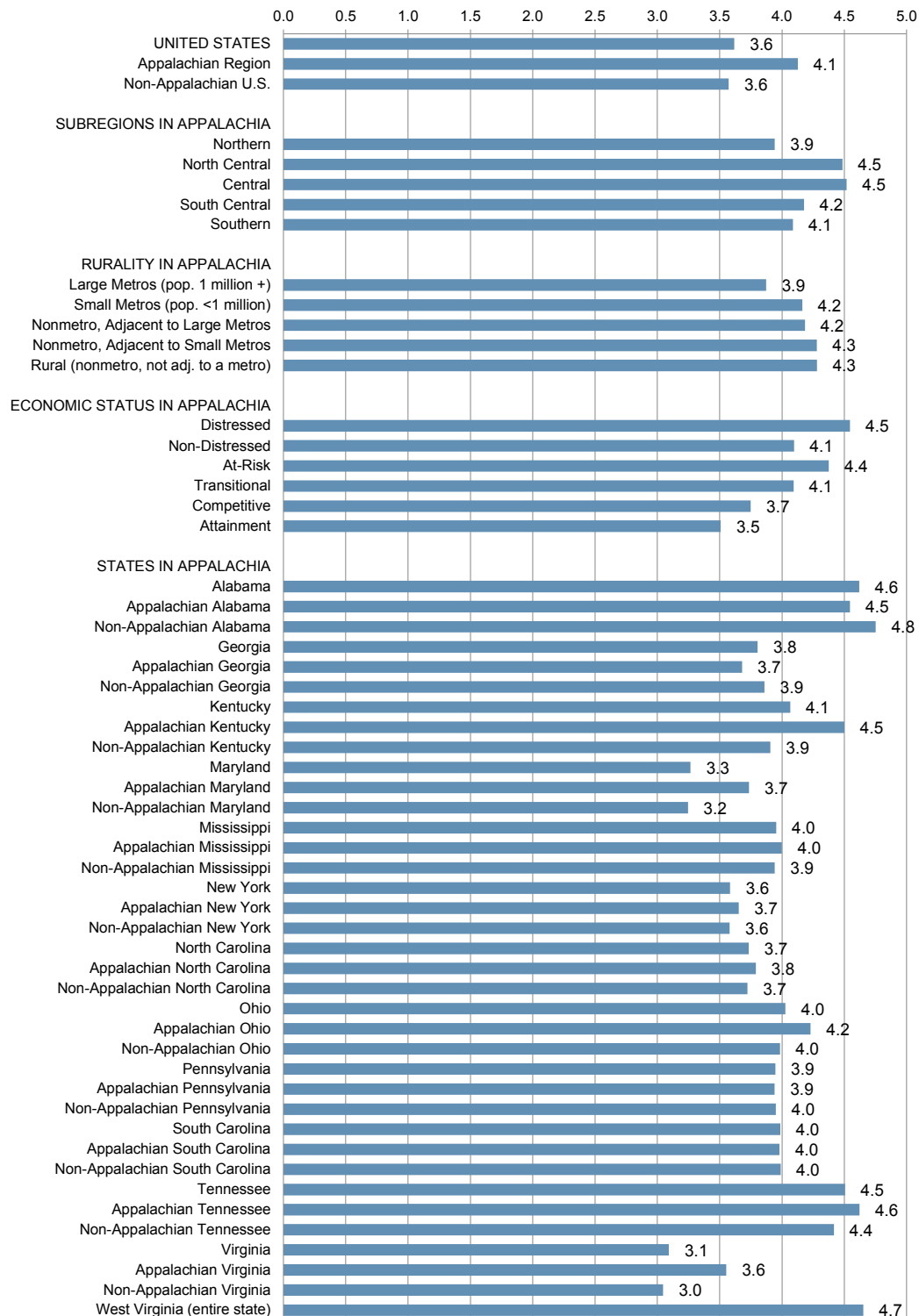
Figure 42 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 41: Map of Mentally Unhealthy Days per Person per Month in the Appalachian Region, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Figure 42: Chart of Mentally Unhealthy Days per Person per Month, 2014

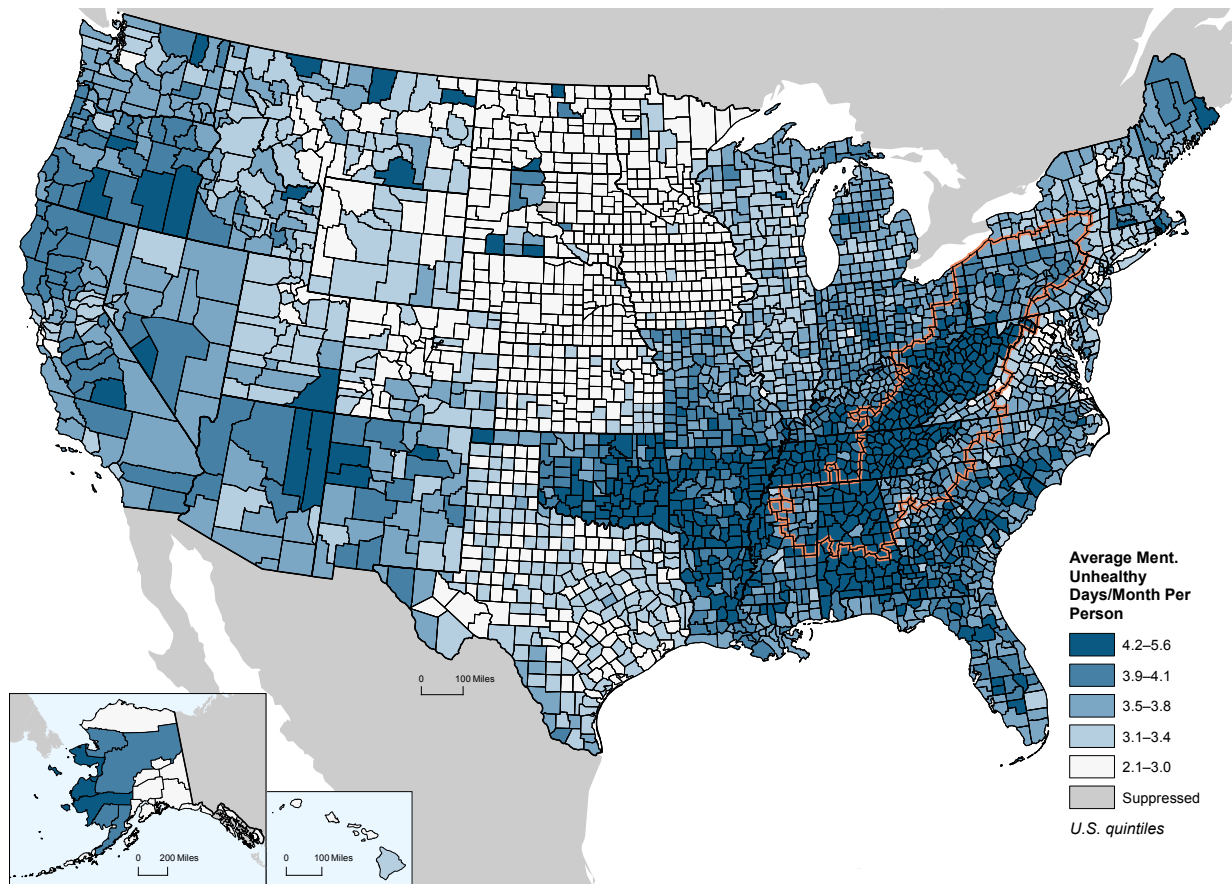


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Overview: Mentally Unhealthy Days in the United States

Figure 43 shows the variation in the frequency of mentally unhealthy days across the United States. The pattern of high values throughout Appalachia extends into much of the southern part of the country, including pockets in the coastal Southeast. High values are also found in the Mississippi Delta region, including north into Missouri and west into Oklahoma. Counties throughout the middle of the country, stretching from the Dakotas and Minnesota in the north to Texas in south, have the lowest levels in the country. Counties throughout the West generally perform on par with the national average, with pockets of both good and bad performance.

Figure 43: Map of Mentally Unhealthy Days per Person per Month in the United States, 2014

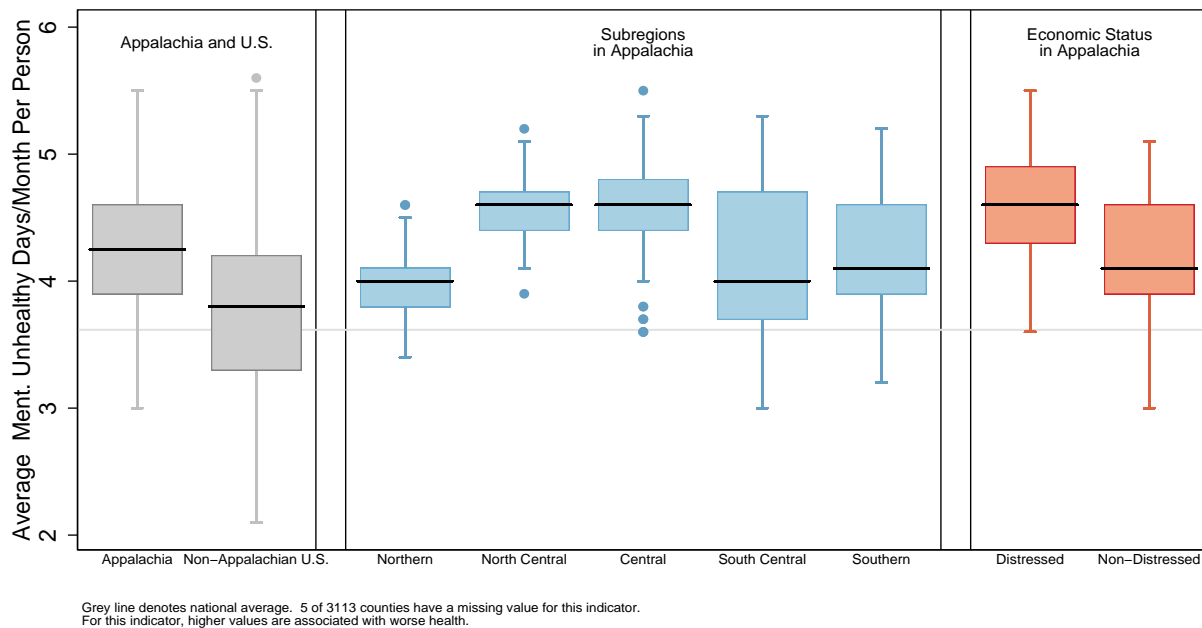


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Distribution of Mentally Unhealthy Days

Figure 44 shows the distribution of mentally unhealthy days by geography and economic status. The shaded boxes show the middle 50 percent of values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, five have a missing value for this indicator and are not included. For this measure, higher values are associated with worse health.

Figure 44: Box Plot of Mentally Unhealthy Days per Person per Month by Geography and Economic Status, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

The distribution of mentally unhealthy days among national quintiles for Appalachian counties is shown in Table 22. Of the 420 counties in the Region, 210 (50 percent) rank in the worst-performing national quintile, while only 2 counties (nearly zero percent) rank in the top-performing national quintile.

Table 22: Distribution of Mentally Unhealthy Days per Person per Month among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Mentally unhealthy days	2	0%	19	5%	96	23%	93	22%	210	50%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

KEY FINDINGS | HIV Prevalence

- The prevalence of HIV is 57 percent lower in the Appalachian Region than in the nation as a whole.
- Among the five subregions, Southern Appalachia has the highest HIV prevalence, a figure that is still 41 percent lower than the national average.
- There is an urban-rural divide in HIV rates in the Appalachian Region. Residents living in the Appalachian Region's large metro areas are more than twice as likely to have HIV as those living in the Region's rural areas.
- The Appalachian Region's non-distressed counties report HIV rates 57 percent higher than the rates reported by the Region's distressed counties.

Background

The HIV prevalence rate measures the number of people living with HIV per 100,000 population. This measure is based on 2013 data from the Centers for Disease Control and Prevention. HIV is a virus that attacks the immune system, making it difficult for the body to fight off infections and disease. More than 1.2 million people in the United States are living with HIV, and among those infected, one in eight are unaware of their condition (Centers for Disease Control and Prevention, HIV, 2016).

In the United States, HIV is spread primarily through unprotected sex or sharing of intravenous drug use material with infected persons (Centers for Disease Control and Prevention, HIV Transmission, 2016). According to CDC, there are a number of ways to prevent HIV infection, including: abstinence, limiting the number of sexual partners, using condoms, and not sharing needles. Additionally, there are medications that reduce the risk of infection (Centers for Disease Control and Prevention, HIV Prevention, 2016). While HIV cannot be cured, it can be managed. There are a number of complications related to HIV infection, including: AIDS, certain cancers, tuberculosis, and hepatitis B and C (Centers for Disease Control and Prevention, TB and HIV Coinfection, 2016); (Centers for Disease Control and Prevention, HIV and Viral Hepatitis, 2014). Because HIV and hepatitis B and C are transmitted through common modes, people with HIV are at increased risk of hepatitis coinfection. CDC notes that approximately 80 percent of people with HIV who inject drugs also have hepatitis C. HIV coinfection more than triples the risk for liver disease, liver failure, and liver-related death from hepatitis C (Centers for Disease Control and Prevention, HIV and Viral Hepatitis, 2014).

Since 2005, new diagnoses of HIV have decreased among some groups, including heterosexuals, intravenous drug users, and women; however, African-Americans and Latinos have seen an increase over the same period (Centers for Disease Control and Prevention, HIV by Group, 2017). The majority of new

diagnoses occur among homosexual men (Centers for Disease Control and Prevention, HIV by Group, 2017).

Past studies have found HIV rates to be higher in urban areas, particularly those located in the South (Vyavaharkar, Glover, Leonhirth, & Probst, 2013). Prevention and treatment of HIV requires a complex and interconnected web of programs and resources. For instance, a past study determined that an HIV vaccine might be acceptable to high-risk drug users in Appalachia, but successful implementation would first require the creation of a multitude of specific programmatic details to address social norms and other barriers in the Region (Young, DiClemente, Halgin, Sterk, & Havens, 2014).

One particularly important component of HIV prevention efforts include improving the rates of early diagnosis and then treating those diagnosed to achieve viral suppression. Increasing education, testing, and awareness of HIV, as is the case for so many health issues, are key factors.

Overview: HIV Prevalence in the Appalachian Region

At 153 cases of HIV per 100,000 population, HIV prevalence in the Appalachian Region is 57 percent lower than the national rate of 355 cases per 100,000. Southern Appalachia has the highest rate among the subregions at 211 cases per 100,000 population, which is still 41 percent lower than the national rate. Central Appalachia is the best-performing subregion in Appalachia, with an HIV rate of just 63 cases per 100,000 population. Northern Appalachia (131 cases per 100,000 population), North Central Appalachia (99 cases), and South Central Appalachia (157 cases) are all well below the national figure.

As one moves from large metro areas to rural areas throughout Appalachia, HIV prevalence declines. In large metro areas in the Region, the number of reported cases per 100,000 population is 207, more than double the 90 cases reported in the Region's rural areas. The Appalachian Region's distressed counties (100 cases per 100,000 population) report lower HIV prevalence than non-distressed counties (157 cases).

Among the Appalachian portions of each state in the Region, Maryland's three counties report the highest HIV rates at 295 cases per 100,000, although this number is still below the national rate. As expected given the subregional trends, the Appalachian portions of Alabama (254 cases per 100,000 population), South Carolina (228 cases), Mississippi (188 cases), and Georgia (165 cases) report the highest rates in the Region, but these figures are all still well below the national rate. Appalachian North Carolina (188 cases per 100,000 population) and Appalachian New York (162 cases) are also found in this range.

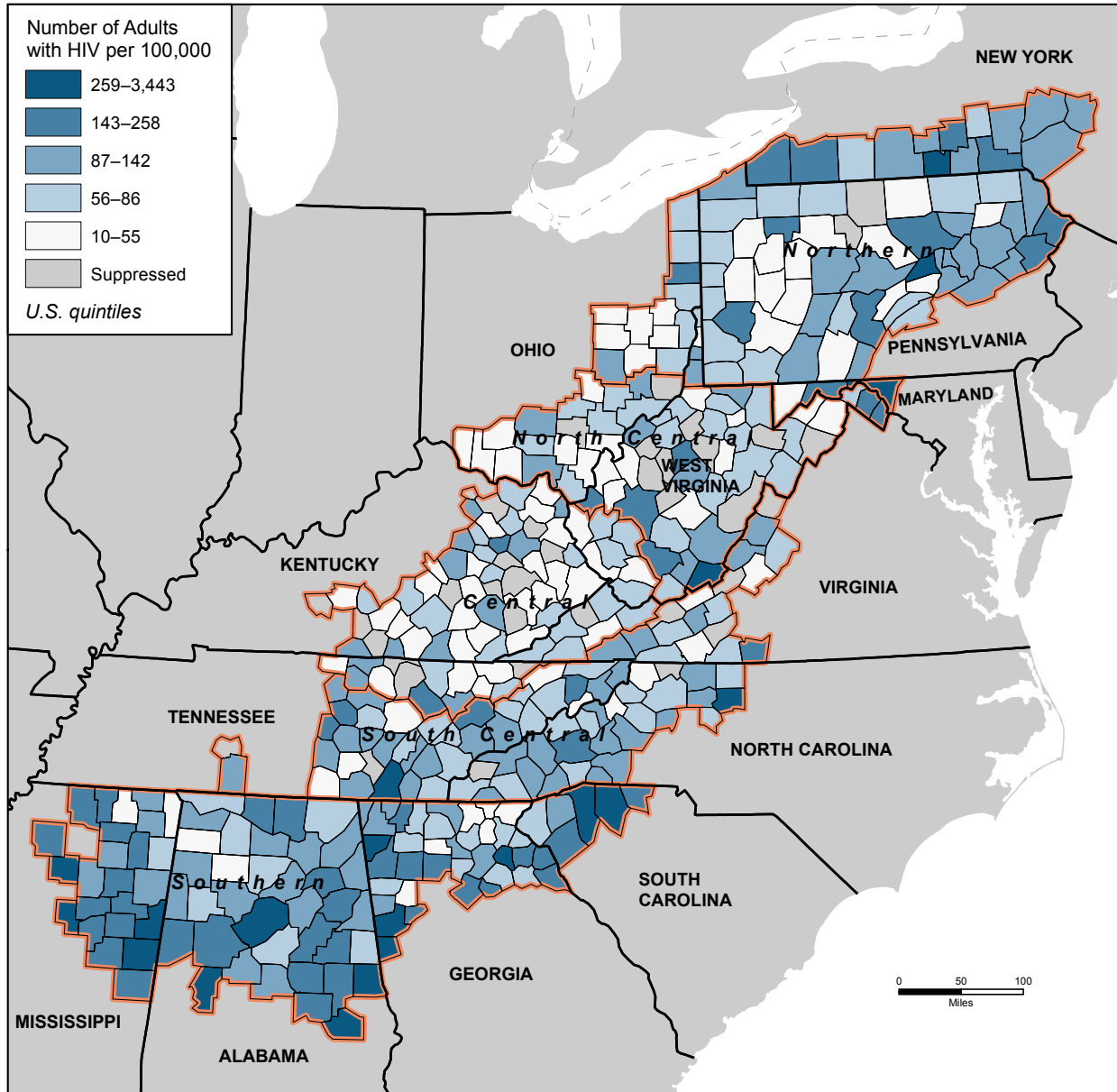
The rates reported by states as a whole demonstrate the urban-rural divide in HIV prevalence. New York (772 cases per 100,000 population) and Maryland (638 cases) have the highest rates among the thirteen states when considering both Appalachian and non-Appalachian portions. These high rates can most likely be explained by the large percentages of the two states' populations residing in New York City and the Baltimore-Washington metropolitan areas, respectively. Georgia (495 cases per 100,000 population) reports the third highest figure among states as a whole, a finding consistent with previously discussed trends regarding both urban-rural differences (Atlanta is the largest metropolitan area in the state) and a generally higher prevalence in the South.

Figure 45 shows the variation in HIV prevalence across the Appalachian Region. Darker blue indicates higher HIV rates among a county's residents. Southern Appalachia has the highest rate among the subregions, and each of the four states—Alabama, Georgia, Mississippi, and South Carolina—have multiple counties in the worst-performing national quintile.

Figure 46 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout

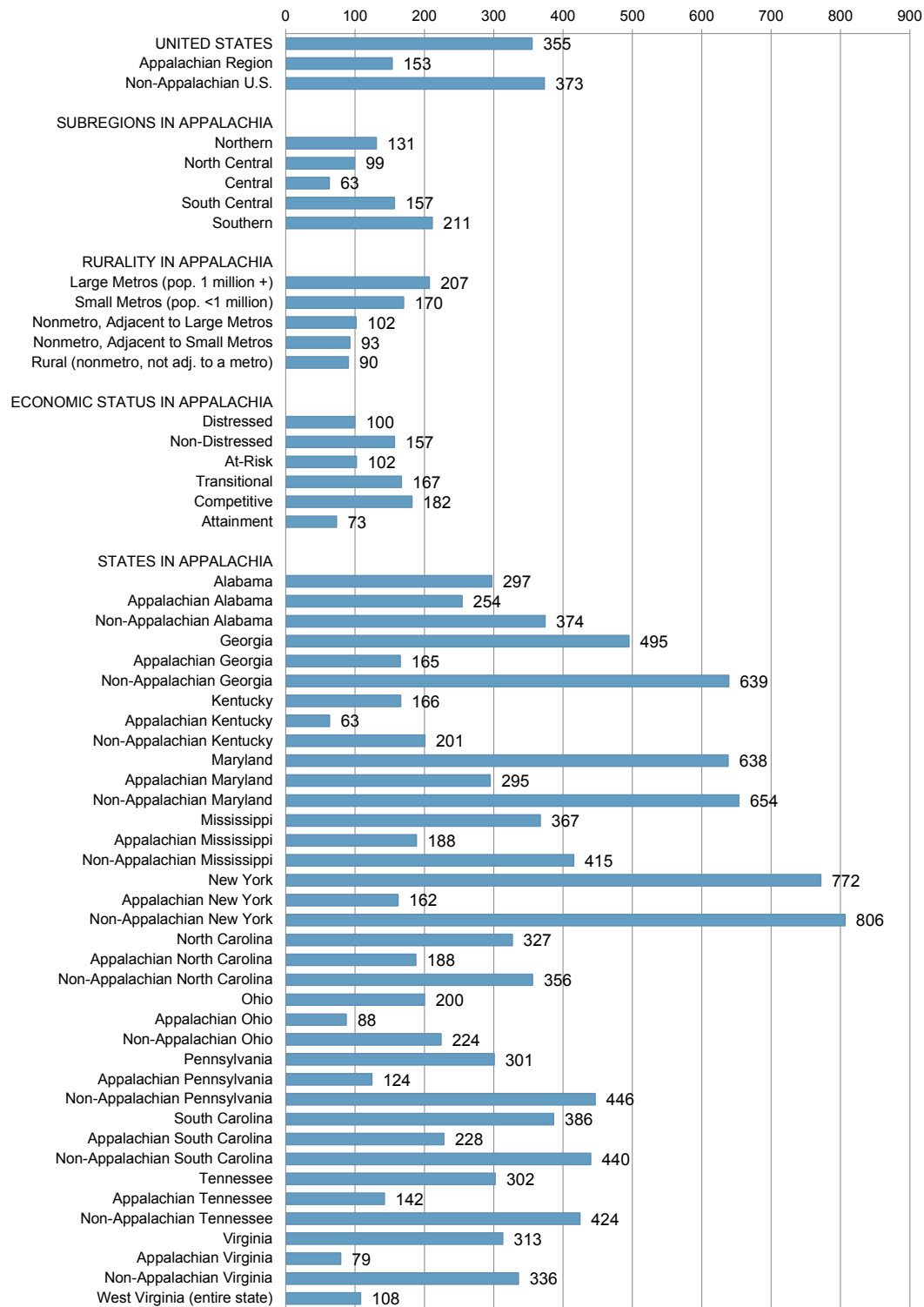
Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 45: Map of HIV Prevalence per 100,000 Population in the Appalachian Region, 2013



Data source: CDC National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Centers for Disease Control and Prevention <http://gis.cdc.gov/grasp/nchhstpatlas/main.html?value=AQT>.

Figure 46: Chart of HIV Prevalence per 100,000 Population, 2013

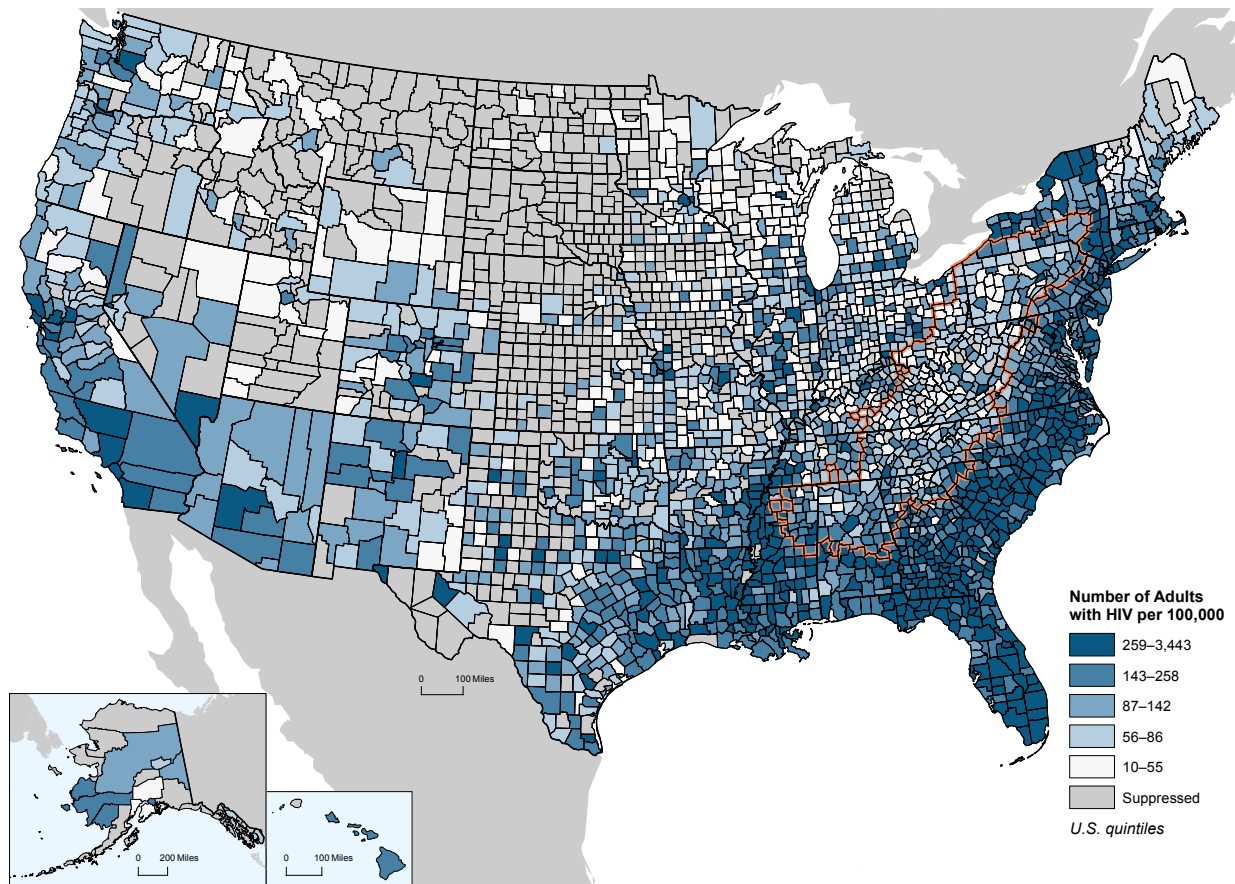


Data source: CDC National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Centers for Disease Control and Prevention <http://gis.cdc.gov/grasp/nchhstpatlas/main.html?value=AQT>.

Overview: HIV Prevalence in the United States

Figure 47 shows the variation in HIV prevalence across the United States. The map shows a clear concentration of high HIV rates along the East Coast, from New England to Florida and then into inland areas of the South, including the Mississippi Delta region. Throughout the East, as well as across the rest of the country, rates are noticeably higher in and around large metropolitan areas. Many counties throughout the West and Upper Midwest have suppressed values, and thus a complete picture of national HIV prevalence is unavailable.

Figure 47: Map of HIV Prevalence per 100,000 Population in the United States, 2013

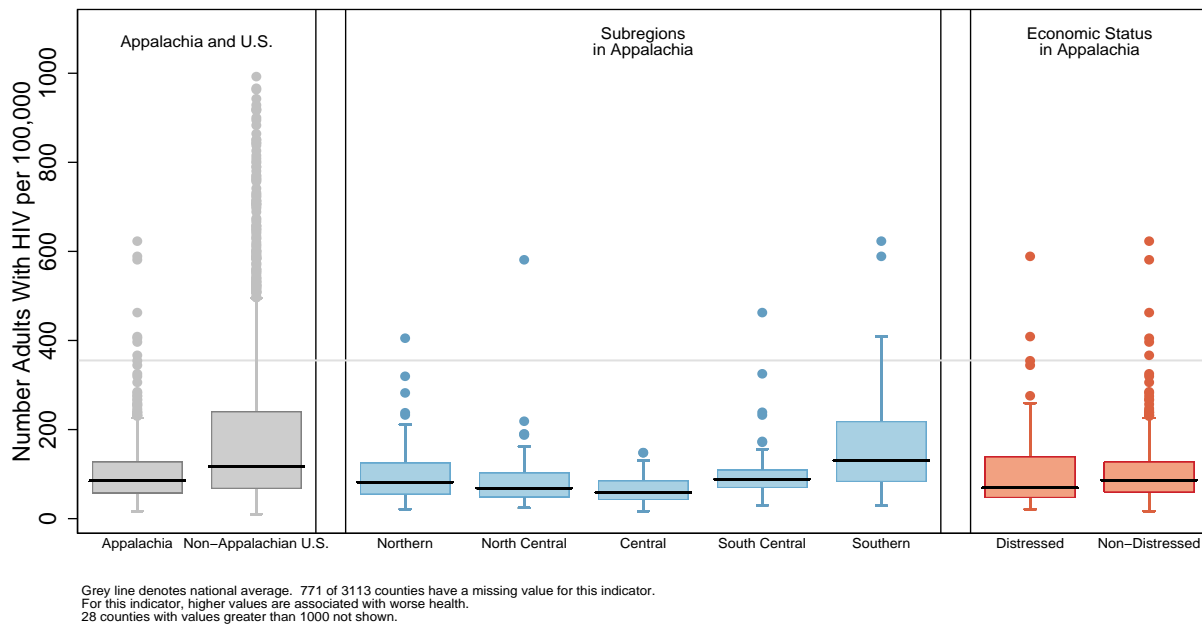


Data source: CDC National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Centers for Disease Control and Prevention <http://gis.cdc.gov/grasp/nchstp/atlas/main.html?value=AQT>.

Distribution of HIV Prevalence

Figure 48 shows the distribution of HIV prevalence rates by geography and economic status. The shaded boxes show the middle 50 percent of values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of the 3,113 counties in the nation, 771 have a missing value for this indicator, and 28 counties with values greater than 1,000 are not included in this box plot. For this measure, higher values are associated with worse health.

Figure 48: Box Plot of HIV Prevalence per 100,000 Population by Geography and Economic Status, 2013



Data source: CDC National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Centers for Disease Control and Prevention <http://gis.cdc.gov/grasp/nchhstpatlas/main.html?value=AQT>.

The distribution of HIV prevalence among national quintiles for Appalachian counties is shown in Table 23. Of the 420 counties in the Region, 20 (5 percent) rank in the worst-performing national quintile, while 89 (21 percent) are in the best-performing national quintile.

Table 23: Distribution of HIV Prevalence per 100,000 Population among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
HIV prevalence	89	21%	109	26%	104	25%	61	15%	20	5%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.



KEY FINDINGS | Diabetes Prevalence

- The prevalence of diabetes in the Appalachian Region is 11.9 percent, a mark higher than the 9.8 percent experienced by the nation as a whole.
- All five subregions in Appalachia report a higher prevalence of diabetes than the national average, with Central Appalachia (13.5 percent) and North Central Appalachia (12.8 percent) reporting the highest percentages.
- There is an urban-rural divide in diabetes prevalence—13.0 percent of the residents in the Appalachian Region’s rural counties have been diagnosed with the disease, compared to 10.5 percent of those living in the Region’s metro areas.
- There is also a divide in diabetes prevalence based on economic status. The Appalachian Region’s distressed counties report a mark of 13.7 percent, whereas the Region’s non-distressed counties report 11.7 percent.

Background

Diabetes prevalence is the percentage of adults age 20 and older who have been diagnosed with Type 1 or Type 2 diabetes. The measure is based on 2012 information from the Centers for Disease Control and Prevention that combines multiple datasets and direct survey responses to estimate the local prevalence rate (Centers for Disease Control and Prevention, Diabetes(b) 2016).

Type 2 diabetes is much more common among adults than Type 1 diabetes—approximately 30 million adults have been diagnosed with Type 2 diabetes in the United States (Centers for Disease Control and Prevention, Diabetes, 2014). Type 2 diabetes is considered a preventable disease, unlike the Type 1 variant (Centers for Disease Control and Prevention, Diabetes(a) 2016). According to CDC, the risk factors for Type 2 diabetes include: older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance, physical inactivity, race, and ethnicity (Centers for Disease Control and Prevention, Diabetes 2015). Among the many complications of diabetes, the disease can result in blindness, kidney failure, neuropathy, and lower-extremity amputation (Centers for Disease Control and Prevention, Diabetes, 2014). Diabetics have a higher risk of premature death than those living without diabetes (Centers for Disease Control and Prevention, Diabetes, 2014). Diabetes is known to increase the risk of depression and result in a lower quality of life among diagnosed adults (Centers for Disease Control and Prevention, Diabetes, 2014).

According to the National Center for Health Statistics, three percent of adults in the United States over the age of twenty have undiagnosed diabetes (Centers for Disease Control and Prevention, Diabetes 2016). Diabetes prevalence has increased in conjunction with the recent rise in obesity rates (Eckel, et al., 2011). Diabetes prevalence among rural residents is much higher than for those living in urban areas (Krishna, Gillespie, & McBride, 2010). In general, older individuals are at an increased risk for developing

diabetes, as are minorities and low-income individuals (Centers for Disease Control and Prevention, Diabetes, 2014).

Overview: Diabetes Prevalence in the Appalachian Region

With 11.9 percent of Appalachian residents age 20 and older diagnosed with diabetes, the disease is more common in the Appalachian Region than in the nation as a whole (9.8 percent). All five subregions in Appalachia report higher diabetes prevalence than the national figure, with Central (13.5 percent) and North Central (12.8 percent) Appalachia reporting the highest percentages.

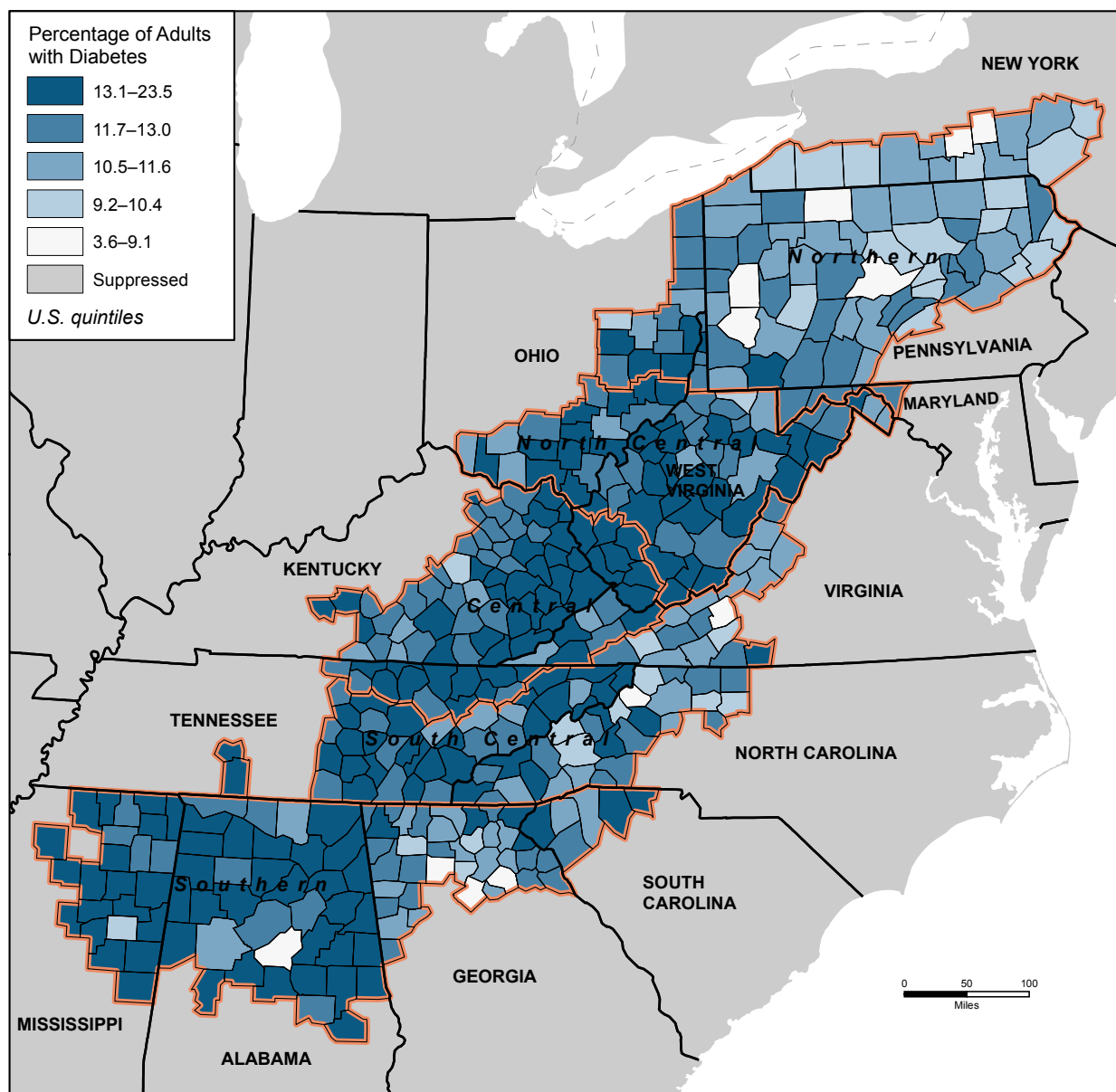
There is an urban-rural divide in diabetes prevalence. In the Appalachian Region's rural counties, 13.0 percent of the residents have been diagnosed with the disease, compared to 10.5 percent of those living in the Region's metro areas. There is also a divide in diabetes prevalence based on economic status. Distressed counties in Appalachia report an average of 13.7 percent, a mark higher than the 11.7 percent reported in the Region's non-distressed counties.

When considering the Appalachian portions of states throughout the Region, the percentages mirror the subregional trends and tend to be highest in the central and southern areas. Appalachian Mississippi reports the highest prevalence at 13.8 percent, with the Appalachian portions of Kentucky (13.3 percent), Tennessee (13.0 percent), and Alabama (12.9 percent) also reporting high percentages. West Virginia (13.1 percent) also reports a high percentage of its residents living with diabetes.

Figure 49 shows the variation in diabetes prevalence across the Appalachian Region. Darker blue indicates a higher incidence of diabetes among a county's residents. High levels of diabetes prevalence are found throughout much of the Region, with many counties ranking in the two worst-performing national quintiles.

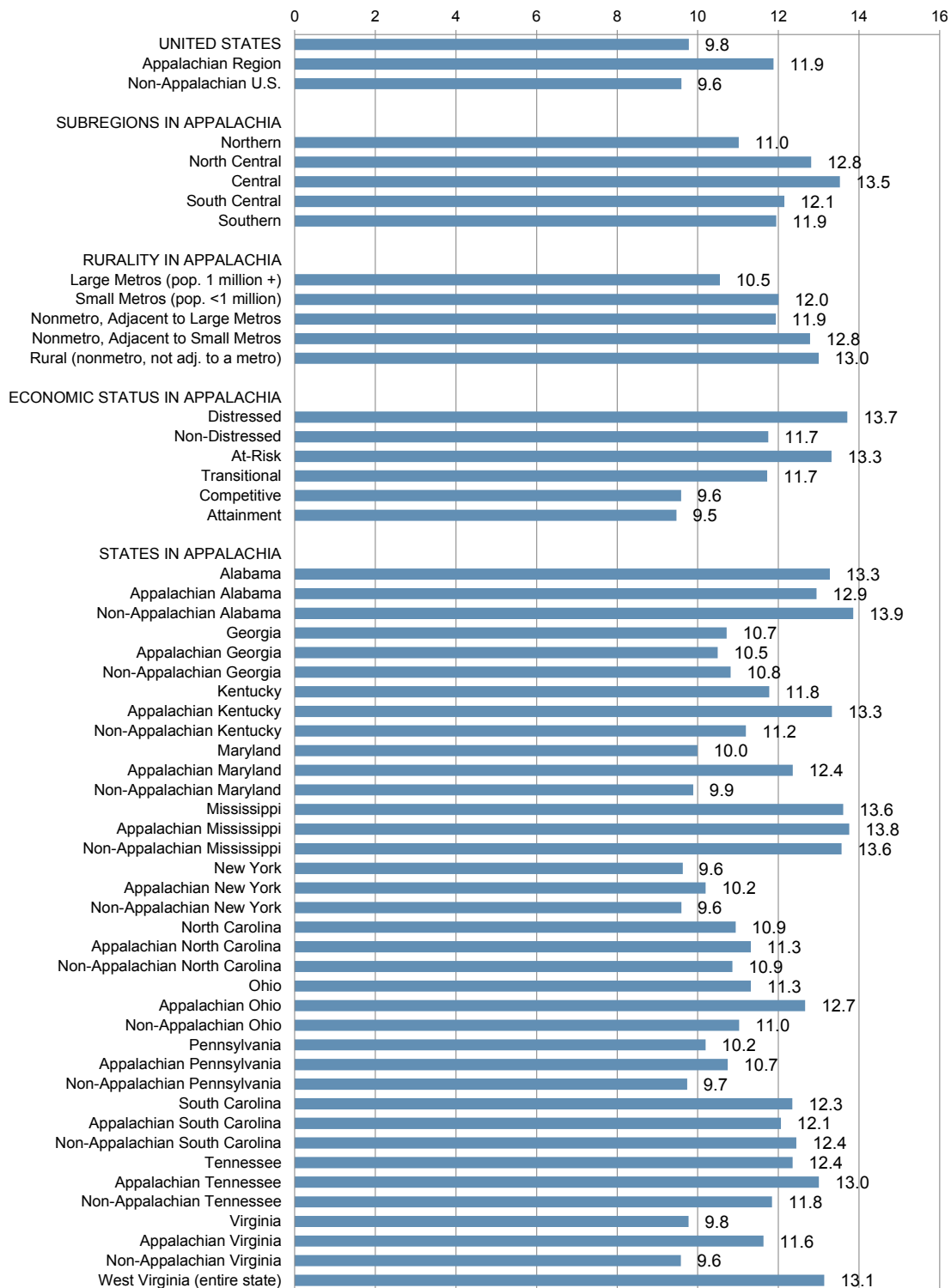
Figure 50 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 49: Map of Percentage of Adults with Diabetes in the Appalachian Region, 2012



Data source: National Center for Chronic Disease Prevention and Health Promotion; Division of Diabetes Translation County Data Indicators. Centers for Disease Control and Prevention. <http://www.cdc.gov/diabetes/data/countydata/countydataindicators.html>

Figure 50: Chart of Percentage of Adults with Diabetes, 2012

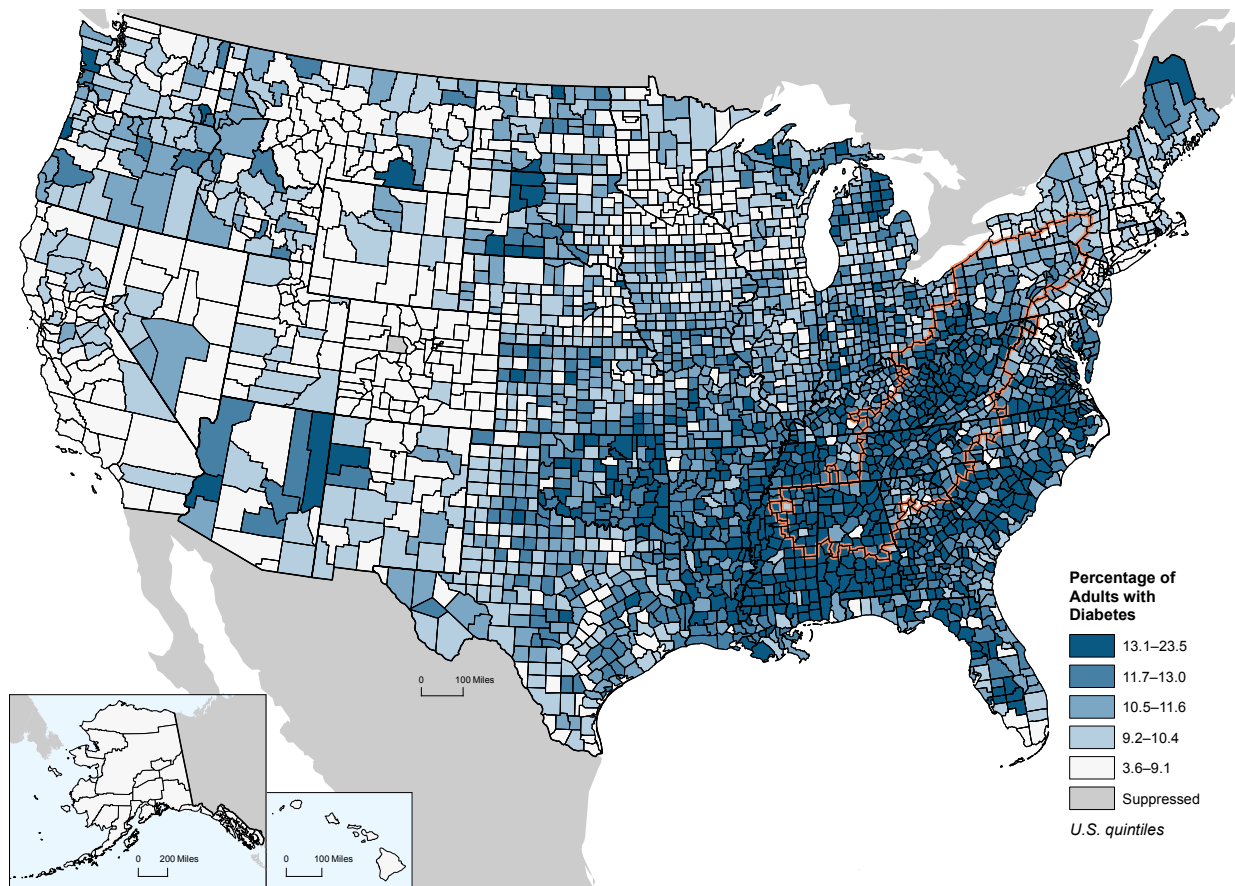


Data source: National Center for Chronic Disease Prevention and Health Promotion; Division of Diabetes Translation County Data Indicators. Centers for Disease Control and Prevention. <http://www.cdc.gov/diabetes/data/countydata/countydataindicators.html>

Overview: Diabetes Prevalence in the United States

Figure 51 shows the variation in diabetes prevalence across the United States. High percentages are not confined to Appalachia and stretch across the Region's borders into surrounding areas including the Midwest, Deep South, and coastal Southeast. Many of the counties located in the western part of the country report very low levels of diabetes. New England also has many counties ranking in the best-performing national quintile. Throughout the country, counties surrounding large metropolitan areas tend to rank in the two best-performing quintiles, with diabetes prevalence increasing as areas become more rural.

Figure 51: Map of Percentage of Adults with Diabetes in the United States, 2012

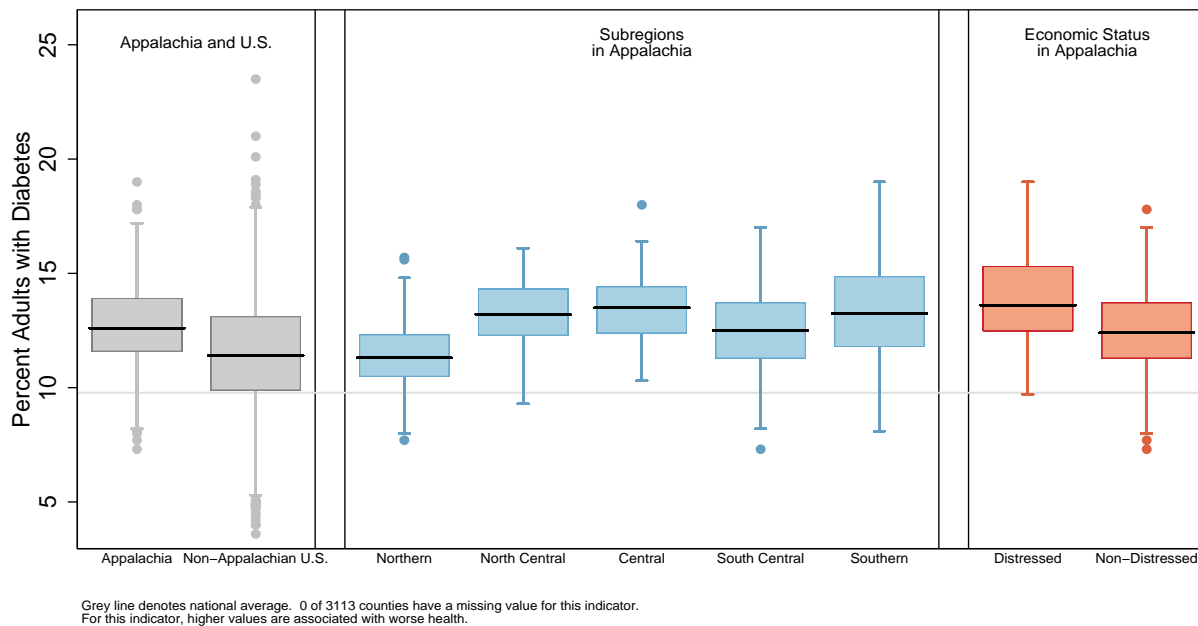


Data source: National Center for Chronic Disease Prevention and Health Promotion; Division of Diabetes Translation County Data Indicators. Centers for Disease Control and Prevention. <http://www.cdc.gov/diabetes/data/countydata/countydataindicators.html>

Distribution of Diabetes Prevalence

Figure 52 shows the distribution of diabetes prevalence by geography and economic status. The shaded boxes show the middle 50 percent of values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, none have a missing value for this indicator. For this measure, higher values are associated with worse health.

Figure 52: Box Plot of Percentage of Adults with Diabetes by Geography and Economic Status, 2012



Data source: National Center for Chronic Disease Prevention and Health Promotion; Division of Diabetes Translation County Data Indicators. Centers for Disease Control and Prevention. <http://www.cdc.gov/diabetes/data/countydata/countydataindicators.html>

The distribution of diabetes prevalence among national quintiles for Appalachian counties is shown in Table 24. Of the 420 counties in the Region, 180 (43 percent) rank in the worst-performing national quintile, while 12 (3 percent) rank in the best-performing national quintile.

Table 24: Distribution of Percentage of Adults with Diabetes among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Diabetes prevalence	12	3%	32	8%	68	16%	128	30%	180	43%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.



KEY FINDINGS | Adult Obesity Prevalence

- The prevalence of adult obesity is 31.0 percent throughout the Appalachian Region, a mark higher than the 27.4 percent experienced in the nation as a whole.
- All five subregions throughout Appalachia report adult obesity percentages higher than the national average, with Central Appalachia (34.7 percent) and North Central Appalachia (33.4 percent) reporting the highest percentages.
- There is an urban-rural divide in adult obesity prevalence, with 33.1 percent of residents in the Appalachian Region's rural counties classified as obese, compared to 29.5 percent in the Region's large metro areas.
- Residents in the Appalachian Region's distressed counties are particularly prone to high percentages of adult obesity, with 34.7 percent of these residents classified as obese. This compares to 30.7 percent in the Region's non-distressed counties.

Background

Adult obesity prevalence is the percentage of adults age 18 and over who report height and weight measurements resulting in a body mass index of 30 or higher. The data for this measure come from County Health Rankings and are based on 2012 data from both CDC's Behavioral Risk Factor Surveillance System (BRFSS), as well as the U.S. Census Bureau's Population Estimates Program.

The risk factors for obesity fall into three broad groups: individual behaviors, environmental factors, and genetics (Centers for Disease Control and Prevention, Obesity(a), 2016). Behaviors primarily include eating patterns, physical activity levels, and medication use. Environmental factors include the type of food that is accessible, marketing practices of the food industry, education and awareness, and whether the built environment supports physical activity. Although the relationship is not entirely clear, how people respond to both physical activity and certain foods suggests that genetics do play a role in developing obesity (Centers for Disease Control and Prevention, Obesity(a), 2016). Obesity increases the risk for a number of conditions, such as: high blood pressure, high cholesterol, Type 2 diabetes, coronary heart disease, stroke, osteoarthritis, sleep apnea and other breathing problems, some cancers, low quality of life, mental illness, and physical pain (Centers for Disease Control and Prevention, Obesity(a), 2016). Some of the risk factors and complications of obesity are discussed elsewhere in this report.

There are well-known racial and socioeconomic patterns in obesity rates across the United States. African-American and Hispanic adults tend to have the highest rates, and those with low levels of education are also at higher risk (Centers for Disease Control and Prevention, Obesity(b), 2016). The national obesity epidemic of the past two decades has shown signs of stabilization, as increased understanding and visibility of the issue have led individuals and communities across the country to develop and adopt multiple strategies aimed at reversing the trend (Felgal, Carroll, Kit, & Ogden, 2012).

Many community strategies focus on children, aiming to bend the curve with younger generations so that they develop healthy eating and living habits that will last a lifetime (Centers for Disease Control and Prevention, State and Local Programs, Nutrition: Strategies and Resources, 2016).

Overview: Adult Obesity Prevalence in the Appalachian Region

With 31.0 percent of Appalachian residents age 18 and over classified as obese, this health issue is more prevalent in the Region than in the nation as a whole, where the figure stands at 27.4 percent. All five subregions in Appalachia report adult obesity percentages higher than the national average, with Central Appalachia (34.7 percent) and North Central Appalachia (33.4 percent) reporting the highest percentages. Southern Appalachia also reports a high prevalence, with 31.1 percent of the subregion's residents classified as obese.

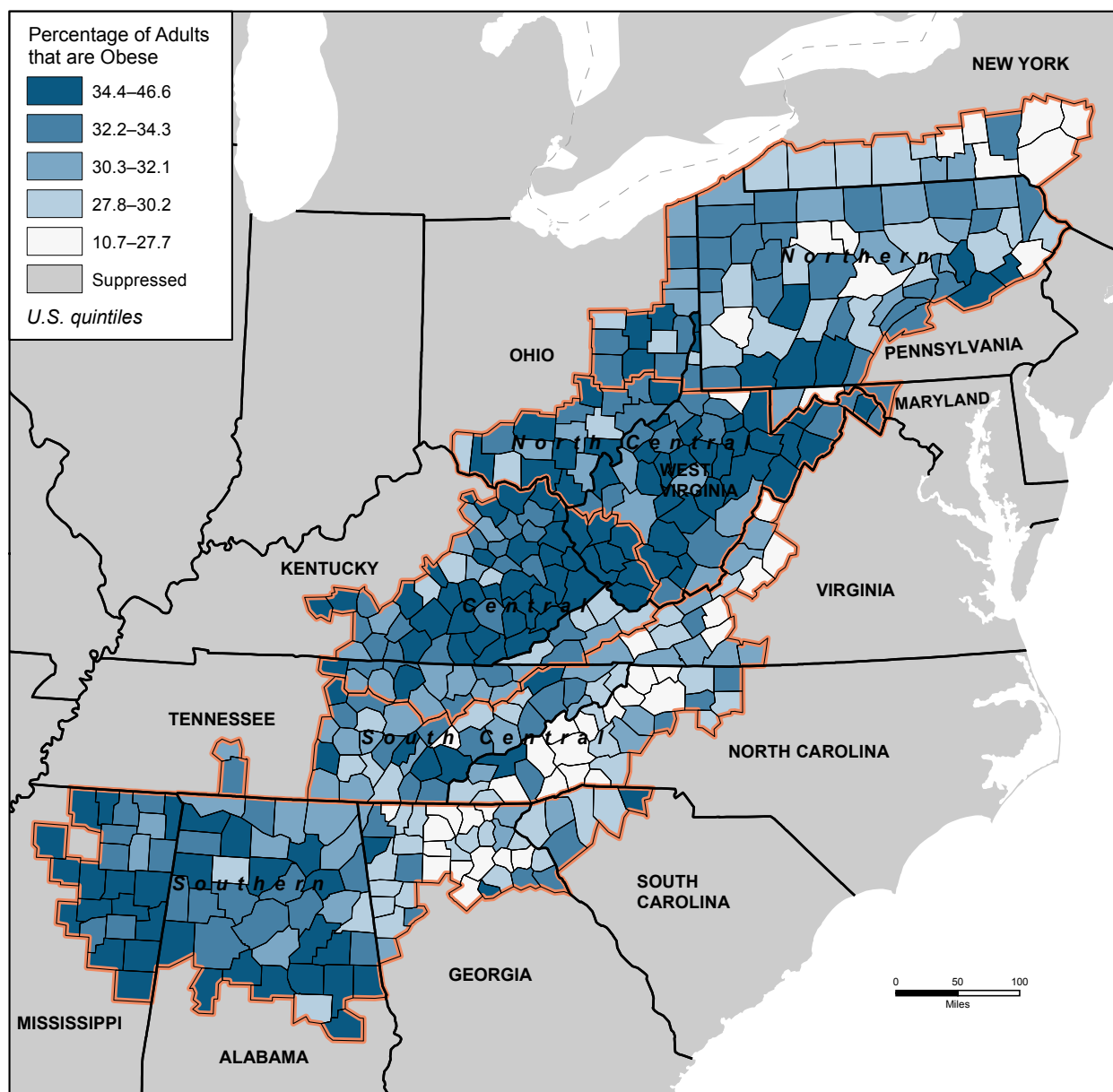
There is an urban-rural divide in adult obesity prevalence, with 33.1 percent of residents living in rural Appalachian counties classified as obese; this compares to 29.5 percent of those living in the Region's large metro areas. There is also a divide in obesity prevalence based on a county's economic status. Distressed counties throughout Appalachia report a prevalence of 34.7 percent, a figure well above the 30.7 percent of those living in the Region's non-distressed counties.

Appalachian Kentucky reports the highest prevalence of obesity in the Region at 35.2 percent, a mark much higher than non-Appalachian Kentucky (31.2 percent). Although both Appalachian Mississippi (34.8 percent) and Appalachian Alabama (33.3 percent) report adult obesity percentages among the highest in the Region, the non-Appalachian portions of these states actually experience higher percentages of adult obesity: non-Appalachian Mississippi reports 35.4 percent and non-Appalachian Alabama reports 34.1 percent. This trend exists in several other states throughout the Region: Appalachian portions of states have lower percentages of adult obesity than the non-Appalachian portions, although the differences are typically quite small. In addition to Mississippi and Alabama, the Appalachian portions of Georgia, North Carolina, South Carolina, and Tennessee also have a slightly lower prevalence of adult obesity than the states' non-Appalachian portions.

Figure 53 shows the variation in adult obesity prevalence across the Appalachian Region. Darker blue indicates a higher prevalence of obesity among a county's residents. The problem is pervasive throughout Appalachia, and especially so in the central and southern portions of the Region, although well-performing pockets of counties do exist along the eastern boundary of the Region.

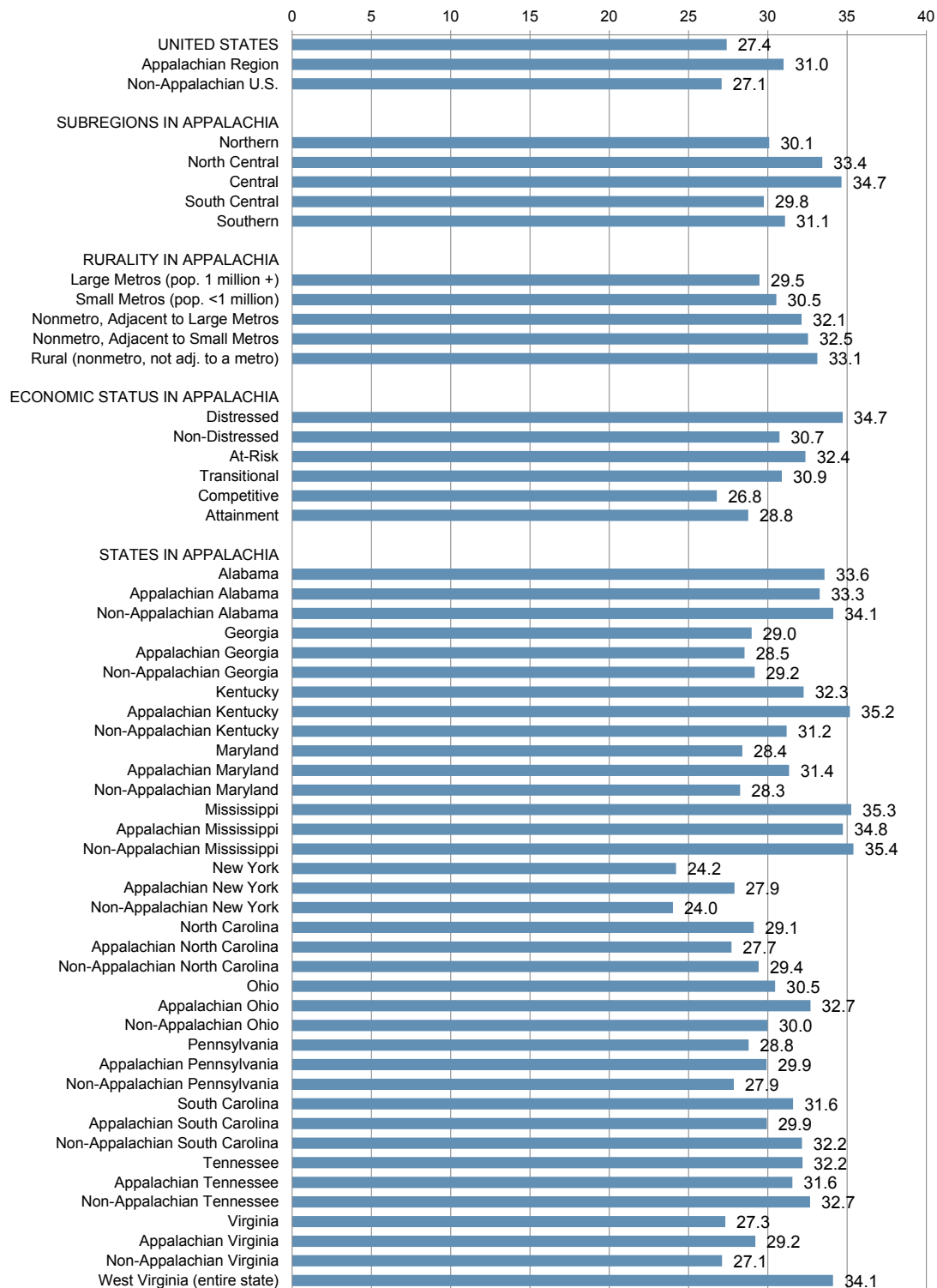
Figure 54 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 53: Map of Adult Obesity Prevalence in the Appalachian Region, 2012



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Figure 54: Chart of Adult Obesity Prevalence, 2012

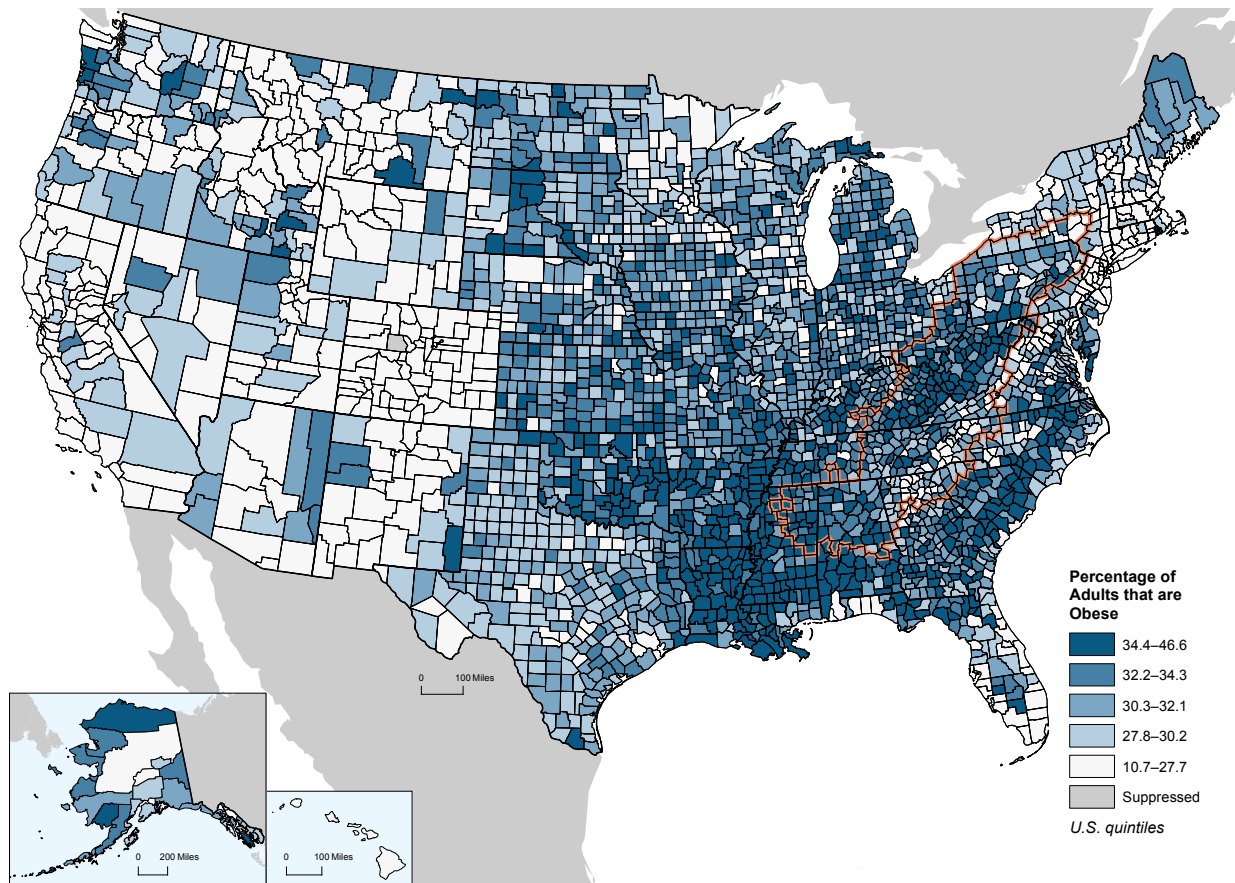


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Overview: Adult Obesity Prevalence in the United States

Figure 55 shows the variation in adult obesity prevalence across the United States. Although there are pockets of counties throughout Appalachia that rank in the worst-performing national quintiles, large concentrations of high obesity percentages are found throughout much of the eastern half of the country. The Mississippi Delta, coastal Southeast, and counties throughout the Midwest and Upper Midwest all experience very high obesity prevalence. Much of the western United States, as well as the Northeast, report low levels. Counties surrounding the country's large metropolitan areas tend to be among the best-performing.

Figure 55: Map of Adult Obesity Prevalence in the United States, 2012

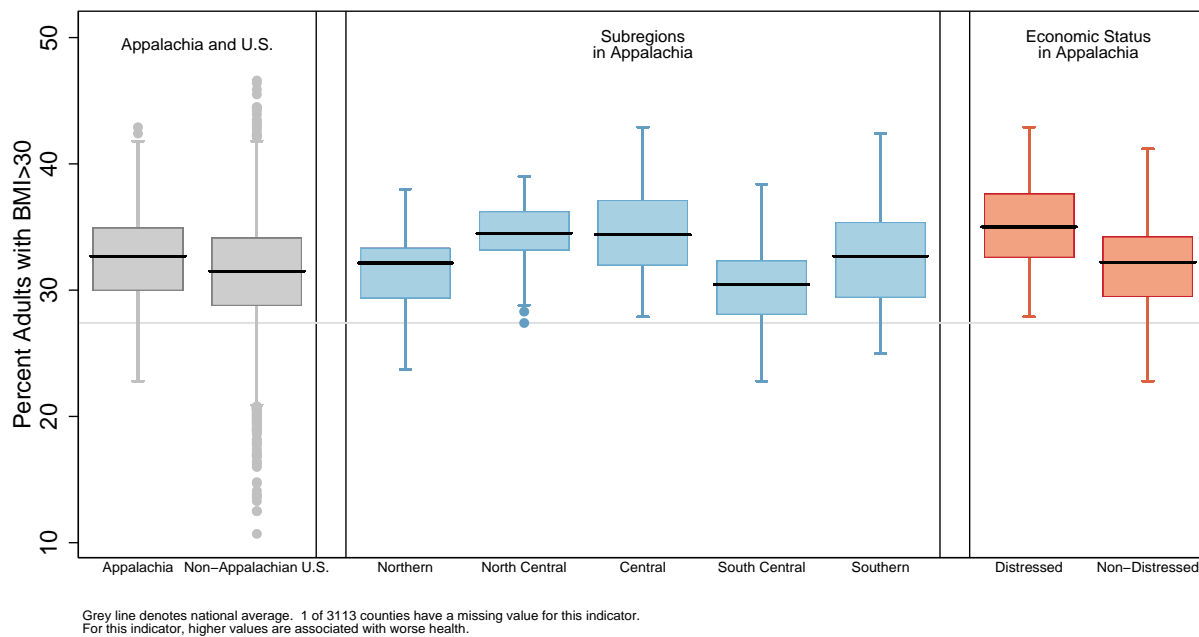


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Distribution of Adult Obesity Prevalence

Figure 56 shows the distribution of adult obesity prevalence by geography and economic status. The shaded boxes show the middle 50 percent of values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, one has a missing value for this indicator. For this measure, higher values are associated with worse health.

Figure 56: Box Plot of Adult Obesity Prevalence by Geography and Economic Status, 2012



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

The distribution of adult obesity prevalence among national quintiles for Appalachian counties is shown in Table 25. Of the 420 counties in the Region, 126 (30 percent) rank in the worst-performing national quintile, while 45 (11 percent) rank in the best-performing national quintile.

Table 25: Distribution of Adult Obesity Prevalence among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Obesity prevalence	45	11%	69	16%	74	18%	106	25%	126	30%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Physically Unhealthy Days

Poor physical health days. County Health Rankings. <http://www.countyhealthrankings.org/measure/poor-physical-health-days>

Mentally Unhealthy Days

The Substance Abuse and Mental Health Services Administration has a general resources page for mental health, including a mental health services locator. <https://www.samhsa.gov/treatment/index.aspx>

Froshaug, DB, Dickinson, L. M., Fernald, D. H., & Green, L. A. (2009). Personal Health Behaviors are Associated with Physical and Mental Unhealthy Days: A Prescription for Health (P4H) Practice-based Research Networks Study. The Journal of the American Board of Family Medicine, 22(4), 368-374.

County Health Rankings. Poor mental health days. <http://www.countyhealthrankings.org/measure/poor-mental-health-days>

HIV Prevalence

Centers for Disease Control and Prevention. HIV/AIDS. <http://www.cdc.gov/hiv/>

CDC includes comprehensive prevention plans and progress on their website: <http://www.cdc.gov/hiv/policies/index.html>

Diabetes Prevalence

Ali S., Stone M.A., Peters J.L., Davies M.J. & Khunti K. The Prevalence of Co-Morbid Depression in Adults with Type 2 Diabetes: A Systematic Review and Meta-Analysis. Diabetic Medicine, 2006; 23(11):1165-1173.

Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion. (2015). "Diabetes Public Health Resource: Methods and Limitations." Centers for Disease Control. Available: <http://www.cdc.gov/diabetes/statistics/incidence/methods.htm>

Menke A, Casagrande S, Geiss L., Cowie, CC. Prevalence of and Trends in Diabetes Among Adults in the United States, 1988-2012. JAMA, 2015; 314(10):1021-1029.

Obesity Prevalence

Centers for Disease Control and Prevention. Overweight and Obesity. Strategies to Prevent Obesity. Available at :<https://www.cdc.gov/obesity/strategies/index.html>

County Health Rankings. Adult obesity. <http://www.countyhealthrankings.org/measure/adult-obesity>

Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of obesity among adults and youth: United States, 2011–2014. NCHS data brief, no 219. Hyattsville, MD: National Center for Health Statistics. 2015. Available at: <https://www.cdc.gov/nchs/data/databriefs/db219.pdf>

Finkelstein EA, Trogon JG, Cohen JW, Dietz W. Annual Medical Spending Attributable to Obesity: Payer-and Service-Specific *Health Affairs* 2009; 28(5):w822-w831.